KEY 4G

Algebra 2 GHP
Final REVIEW
2011-2012

1.) Give an example of a linear, quadratic, and exponential function.

Linear - $f(x) = x+5$ Quadratic - $f(x) = x^2+9$ Exponential - $f(x) = 2^x$

2.) Describe the transformation from $f(x)$ to $g(x)$.

$$f(x) = (5)^x \text{ and } g(x) = 2(5)^x - 4$$

vertically stretched by a factor of 2, and down 4

3.) Write the transformation of f that is reflected across the y-axis.

$$f(x) = \left(\frac{1}{3}\right)^x = 3^{-x}$$

$\boxed{g(x) = 3^x}$

4.) Two thousand dollars is invested at 8% interest compounded annually. Using the formula $A = P\left(1+\frac{r}{n}\right)^{nt}$ determine how much the investment is worth after 1 year.

$$A = 2000\left(1 + \frac{.08}{1}\right)^{1\cdot 1}$$

$\boxed{A = \$2160}$

5.) $1200 ~~thousand~~ dollars is invested at 6.5% interest compounded daily. Using the formula $A = P\left(1+\frac{r}{n}\right)^{nt}$ determine how much the investment is worth after 1 year.

$$A = 1200\left(1 + \frac{.065}{365}\right)^{365}$$

$\boxed{A = \$1280.58}$

6.) Express in terms of $\log_5 A$ and $\log_5 B$: $\log_5 A^6 B^4$

$$\log_5 A^6 + \log_5 B^4$$

$\boxed{6\log_5 A + 4\log_5 B}$

7.) Express in terms of $\log_2 A$ and $\log_2 B$: $\log_2\left(\frac{\sqrt{A}}{B}\right)^3$

$$3\log_2\sqrt{A} - 3\log_2 B$$

$\boxed{\frac{3}{2}\log_2 A - 3\log_2 B}$

8.) Express as a single logarithm: $3\log_{10} c + 4\log_{10} d$

$$\log_{10} c^3 + \log_{10} d^4$$

$\boxed{\log_{10} c^3 d^4}$

9.) Express in terms of $\log_{10} a$ and $\log_{10} b$: $\log_{10} \frac{a^2}{\sqrt{b^3}}$

$\log_{10} a^2 - \log_{10} b^{\frac{3}{2}}$

$2\log_{10} a - \frac{3}{2}\log_{10} b$

10.) Simplify: $e^{6\ln 2}$

$2^6 = 64$

11.) Simplify: $8\log_3 3$

8

12.) Simplify: $\ln e^6$

6

13.) Write an equivalent logarithmic equation of $e^2 \approx 7.39$

$\ln 7.39 \approx 2$

14.) Write an equivalent exponential equation of $x = \ln 4$

$e^x = 4$

15.) Solve for x and round to the nearest hundredth: $1.5^x = 3$

$x = \frac{\log_{10} 3}{\log_{10} 1.5}$ $x \approx 2.71$

16.) Solve for x and round to the nearest hundredth: $7(3)^x - 14 = 35$

$7(3)^x = 49$

$3^x = 7$ $x = \frac{\log_{10} 7}{\log_{10} 3}$ $x \approx 1.77$

17.) Solve for x and round to the nearest hundredth: $e^{2x-1} + 5 = 8$

$\ln e^{2x-1} = \ln 3$

$2x - 1 = \ln 3$

$2x = \ln 3 + 1$ $x = \frac{\ln 3 + 1}{2}$

$x \approx 1.05$

18.) Solve for x: $\log(4x-6)=\log 2x$

$4x-6=2x$

$-6=-2x$

$\boxed{x=3}$

19.) Solve for x: $8\log_6(x-1)=16$

$\log_6(x-1)=2$

$6^2=x-1$

$36=x-1$

$\boxed{x=37}$

20.) Solve for x: $\log_3 5-\log_3 5x=2$

$\log_3 \frac{5}{5x}=2$

$\frac{5}{5x}=3^2$

$\frac{5}{5x}=\frac{9}{1}$

$5=45x$

$\boxed{x=\frac{1}{9}}$

21.) Classify the polynomial by degree and number of terms: $3x-5$

Degree - Linear

Terms - Binomial

22.) Classify the polynomial by degree and number of terms: $x^3y^3-3x^2$

Degree - 6

Terms - Binomial

23.) Classify the polynomial by degree and number of terms: $-x^2-8x+3$

Degree - Quadratic

Terms - Trinomial

24.) Add/Subtract: $(x^2+x+4)+(-x^2+3x+8)$

$\boxed{-2x+12}$

25.) Add/Subtract: $(-x^2y-3xy+2)+(xy-2x^2y)$

$\boxed{-3x^2y-2xy+2}$

26.) Add/Subtract: $3x-6y-2(4x-5y)$

$3x-6y-8x+10y$

$\boxed{-5x+4y}$

27.) Multiply: $-xy(3x^2+4x+1)$

$-3x^3y-4x^2y-xy$

28.) Multiply: $(x-6)(3x+2)$

$3x^2+2x-18x-12$

$3x^2-16x-12$

29.) Multiply: $(x+2)(x^2+3x+1)$

$x^3+3x^2+x+2x^2+6x+2$

x^3+5x^2+7x+2

30.) Divide: $(x^3+4x^2+x-6)\div(x+3)$

$$x+3\overline{)\,x^3+4x^2+x-6}$$

x^2+x-2

$-x^3+3x^2$

$-x^2+3x$

$-2x$

31.) Divide: $(8x^3+12x^2+6x+1)\div(2x+1)$

$$2x+1\overline{)\,8x^3+12x^2+6x+1}$$

$4x^2+4x+1$

$-8x^3+4x^2$

$8x^2$

$-8x^2+4x$

$-2x$

$2x+1$

0

32.) Divide: $\dfrac{2x^3-1}{x+1}$

-1 | 2 0 0 -1

-2 2 -2

2 -2 2 -3

$2x^2-2x+2-\dfrac{3}{x+1}$

33.) List the factors of $f(x)=x^2-x-20$.

$p=\pm 1,2,4,5,10,20$

$q=\pm 1$

$(x-5)(x+4)$

34.) List the factors of $f(x)=3x^2-5x-2$.

$p=\pm 1,2$

$q=\pm 1,3$

$\frac{p}{q}=\pm 1,2,\frac{1}{3},\frac{2}{3}$

$(3x+1)(x-2)$

35.) Determine if x – 1 is a factor of $f(x)=x^3-x^2+3x-2$. If not, what is the remainder?

1 | 1 -1 3 -2
  | 1 0 3
  1 0 3 (1)

no, remainder of 1

36.) Find the roots of $f(x)=x^3+x^2-17x+15$.

$p=\pm 1, 3, 5, 15$ $f(x)=(x-3)(x+5)(x-1)$

$q=\pm 1$

roots: $x=\{3,-5,1\}$

37.) Find the roots of $f(x)=x^4+2x^3-16x^2-2x+15$.

$p=\pm 1, 3, 5, 15$ $f(x)=(x+1)(x-1)(x+5)(x-3)$

$q=\pm 1$

roots: $x=\{-1,1,-5,3\}$

38.) Determine the end behavior of $f(x)=x^3-2x^2+x+5$. → starts down

↑ positive 1 = ends up

down, up

39.) Determine the end behavior of $f(x)=-(x-2)(x+1)^3$. → starts down

↑ negative 1 = ends down

down, down

40.) Simplify: $\frac{x^2-25}{x+5}$ $\frac{(x+5)(x-5)}{x+5}=x-5$

41.) Simplify: $\frac{x^2+x-6}{x^2+2x-8}$ $\frac{(x+3)(x-2)}{(x+4)(x-2)}$

$\frac{x+3}{x+4}$

42.) Simplify: $\frac{2x^2-3x-2}{x^2-4}$ $\quad \frac{(2x+1)(x-2)}{(x+2)(x-2)}$

$$\boxed{\frac{2x+1}{x+2}}$$

43.) Multiply: $\frac{2x^2}{4y^7} \bullet \frac{8y}{4x^3} = \frac{16x^2y}{16x^3y^7} = \boxed{\frac{1}{xy^6}}$

44.) Multiply: $\frac{x-3}{x^2+10x+25} \bullet \frac{4x}{x^2-3x} = \frac{(x-3)}{(x+5)(x+5)} \cdot \frac{4x}{x(x-3)}$

$$= \boxed{\frac{4}{(x+5)^2}}$$

45.) Divide: $\frac{x+1}{x^2+5x+6} \div \frac{x^2+8x+7}{x^2+6x+8} = \frac{x+1}{(x+2)(x+3)} \cdot \frac{(x+4)(x+2)}{(x+7)(x+1)}$

$$\boxed{\frac{x+4}{(x+3)(x+7)}}$$

46.) Divide: $\frac{x^2-81}{x^2+5x+6} \div \frac{x^2+10x+9}{x^2+x-12} = \frac{(x+9)(x-9)}{(x+2)(x+3)} \cdot \frac{(x+4)(x-3)}{(x+9)(x+1)}$

$$\boxed{\frac{(x-9)(x+4)}{(x+2)(x+1)}}$$

47.) Simplify: $\frac{\frac{2}{a}}{\frac{-4}{b}} = \frac{2}{a} \cdot \frac{b}{-4} = \frac{2b}{-4a} = \boxed{\frac{-b}{2a}}$

48.) Simplify: $\dfrac{\frac{3}{5}}{\frac{x}{}+y}$ $\cdot x$ $= \boxed{\dfrac{3x}{5+xy}}$

49.) Simplify: $\dfrac{\frac{3}{x}-\frac{5}{y}}{\frac{2}{x}+\frac{2}{y}}$ $\cdot xy$ $= \boxed{\dfrac{3y-5x}{2y+2x}}$

50.) Simplify: $\dfrac{2}{x+1} \cdot \dfrac{3}{x+4}$

$2(x+4) = 3(x+1)$

$2x+8 = 3x+3$

$\boxed{x=5}$

51.) Solve: $\dfrac{1}{4x+8} = \dfrac{2}{x^2+2x}$

$1(x^2+2x) = 2(4x+8)$

$x^2+2x = 8x+16$

$x^2-6x-16=0$ $\rightarrow$ $(x-8)(x+2)=0$

$\boxed{x=8,}$ ~~-2~~

52.) Solve: $10x\left[\dfrac{2}{x}+\dfrac{1}{5}=\dfrac{3}{10x}-\dfrac{1}{2}\right]$

$20+2x = 3-5x$

$7x = -17$ $\boxed{x=\frac{-17}{7}}$

53.) Solve: $\sqrt{2x+1}-3=0$

$(\sqrt{2x+1})^2 = (3)^2$

$2x+1=9$

$2x=8$

$\boxed{x=4}$

54.) Solve: $(\sqrt{16-3x})^2 = (1)^2$

$16 - 3x = 1$

$-3x = -15$

$\boxed{x = 5}$

55.) Solve: $\sqrt{x+5} - \sqrt{3x+7} = 0$

$(\sqrt{x+5})^2 = (\sqrt{3x+7})^2$

$x + 5 = 3x + 7$

$-2 = 2x \rightarrow \boxed{x = -1}$

56.) If y varies directly as x, and y = 4 when x = 12, find y when x = –2.

$y = kx$

$4 = k(12)$

$k = \frac{1}{3}$

$y = \frac{1}{3}(-2)$

$\boxed{y = \frac{-2}{3}}$

57) If y varies inversely as x, and y = -1 when x = 4, find y when x = 2.

$y = \frac{k}{x}$

$4 \cdot -1 = \frac{k}{4} \cdot 4 \rightarrow k = -4$

$y = \frac{-4}{2}$

$\boxed{y = -2}$

58.) What type of variation is represented by the following equation $y = \frac{3}{x}$

Inverse

59.) What type of variation is represented by the following equation $y = \frac{2}{x}$

Inverse

60.) What type of variation is represented by the following equation $y = \frac{4x}{z^2}$

combined